

HANDS ON WORKSHOP

Setup

- Hardware requirements
 - PC with Windows 10, 64 Bit
 - One Ethernet adapter to be used for TCP/IP (Windows)
 - One additional Intel or Realtek Gigabit Ethernet adapter to be used for EtherCAT
 - At least a Dual Core processor

- Install Visual Studio (2010 or later)

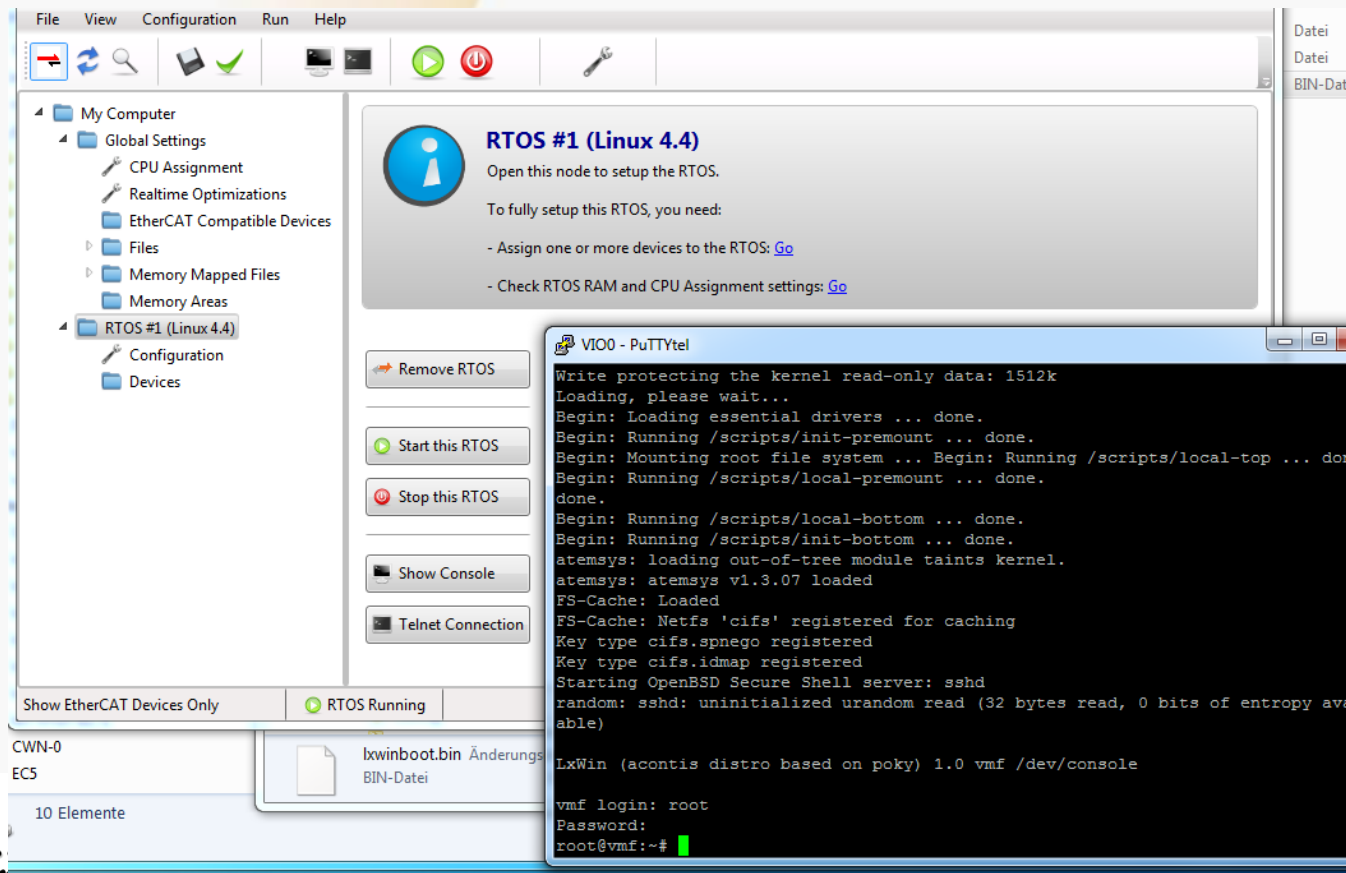
- Install VisualGDB (**after** Visual Studio installation!)
 - <http://visualgdb.com/download/>

- Install Filezilla
 - <https://filezilla-project.org/download.php>

- Install the LxWin Evaluation version
 - <http://software.acontis.com/RTOSWin71/7.1.00.01.LxWin.{6DDDD85E-9932-4127-B35A-10A6493A39C1}/LxWin.7.1.00.01.zip>
- Install the EC-Master package for LxWin
 - <http://software.acontis.com/EC-Master/3.1/Linux/EC-Master-V3.1.0.18-EC-WinRT-Linux-Eval.zip>
 - Unzip all files to C:\EC-Master-Linux

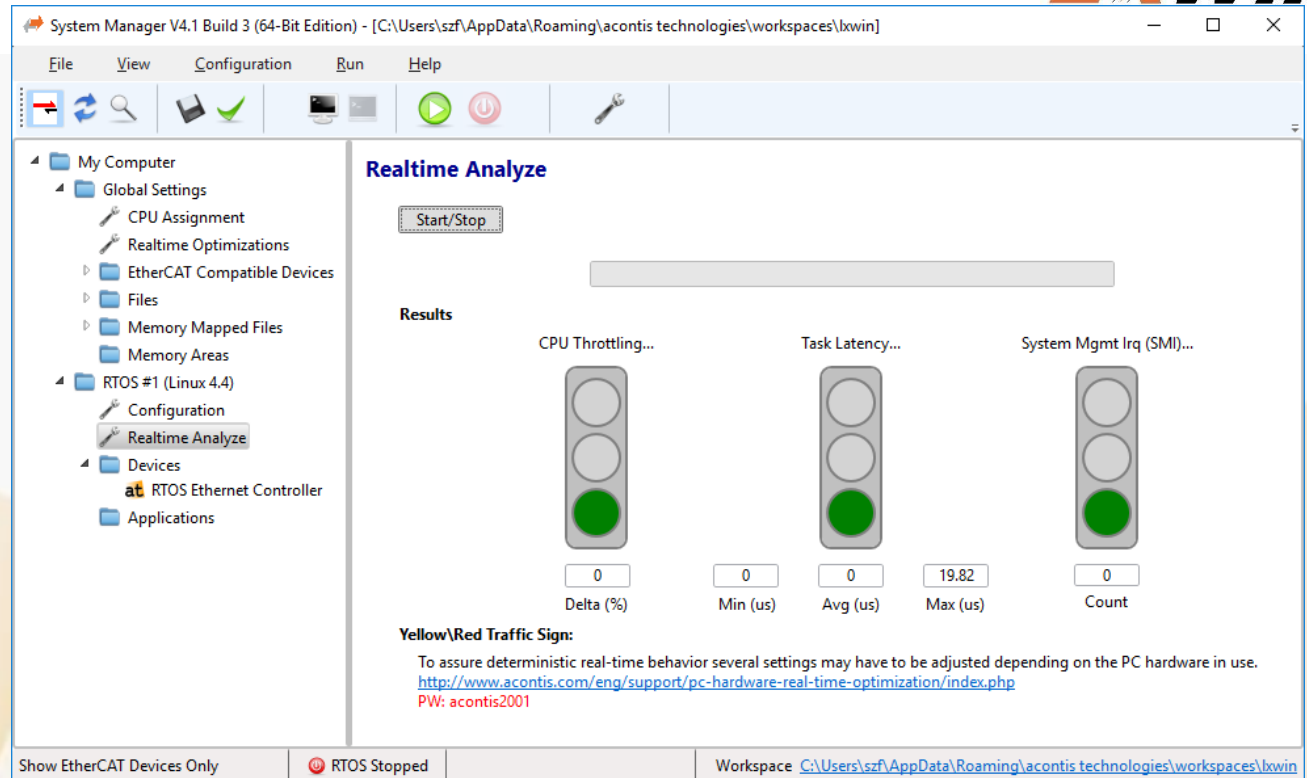
First steps

- Open LxWin System Manager
- Follow the steps described in chapter 3.2 of the LxWin manual
 - Run the shipped Linux image
 - Login into the Linux OS



Real-time analyzation and optimization

- Run the Realtime Analyzer

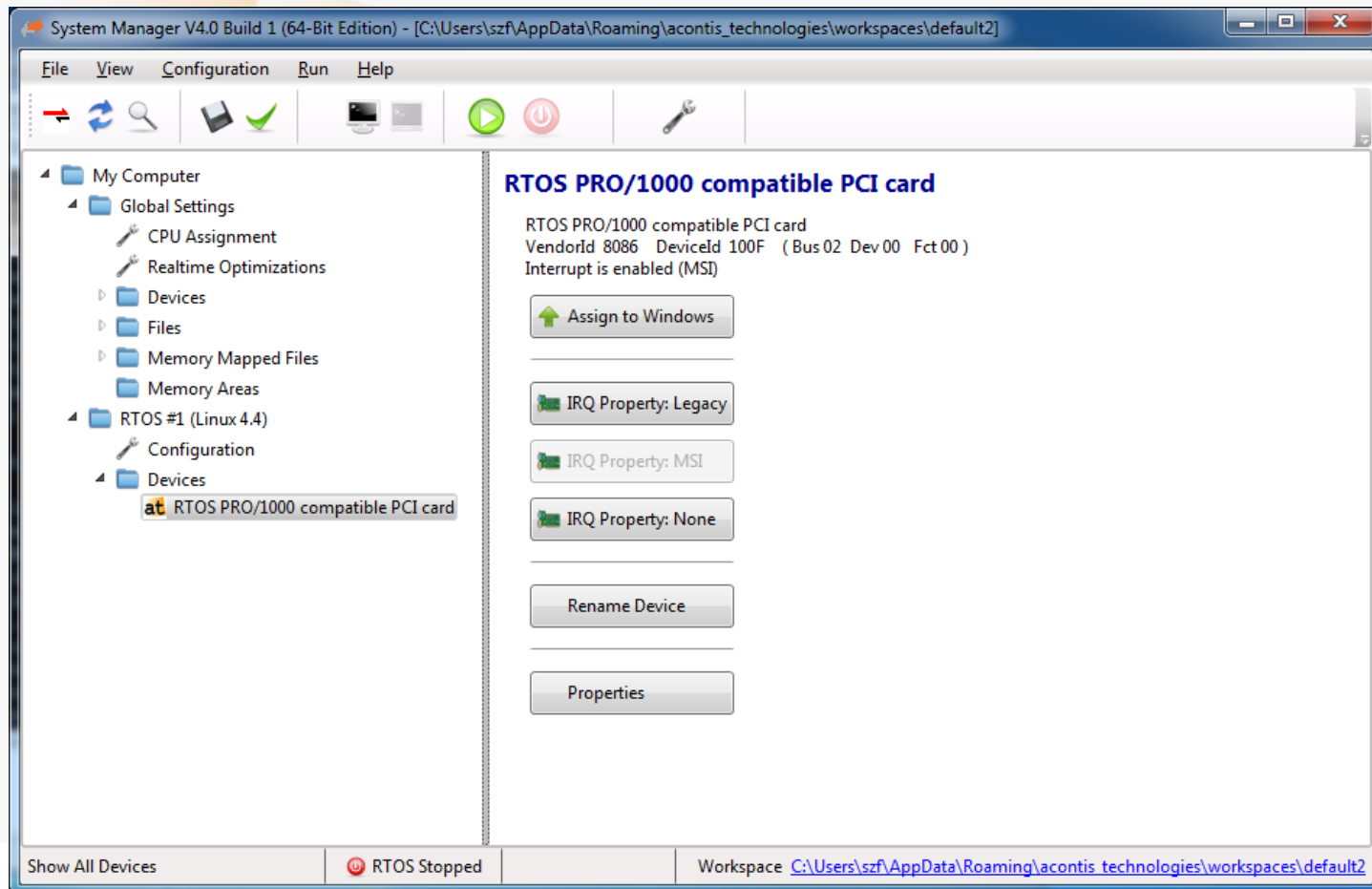


- Possible required real-time optimizations
 - SMI Patch (VT will have to be enabled)
 - C1E Patch
 - BIOS Powermanagement settings
 - USB Legacy

- See chapter 3.7 in the manual
- Access the Windows hard disk via the LxWin file server
 - Files are located in the workspace: <workspace>\rtfiles directory
 - Network share mounted in Linux at /mnt/rtfiles
- Download files from Windows to Linux
 - Start FileZilla
 - Create new Site
 - Server: 192.168.157.2
 - Protocol: SFTP
 - Connection: Normal
 - User: root
 - Password: root

Hardware Partitioning

- Add the Intel Ethernet adapter to Linux
 - See chapter 3.5 of the LxWin manual



- Visual Studio: Follow steps described in chapter 3.4 of the LxWin manual
 - Create a new project using Visual Studio
 - Build and Debug the application

- Eclipse: Follow steps described in chapter 3.3 of the LxWin manual
 - Create a new project using Eclipse
 - Build and Debug the application

EC-Engineer and LxWin on the same PC

The screenshot displays the EC-Engineer software interface on a Windows desktop. The desktop background is orange and features icons for 'Papierkorb' (Recycle Bin) and 'EC-Engineer'. The EC-Engineer application window is open, showing a menu bar (File, View, Network, Settings, Help) and a toolbar with buttons for 'Configuration Mode', 'Export ENI', 'Export EXI', and 'Diagnosis Mode'. The main workspace is divided into two panes: 'Project Explorer' on the left and 'Device Editor' on the right. The 'Device Editor' pane shows the 'Start Page' with the 'EC Engineer' logo. Below the logo, there are sections for 'Add Master Unit' (listing EtherCAT Master Unit (Class A), EtherCAT Master Unit (Class B), and EtherCAT Simulator Unit) and 'Recent Projects' (listing several project files). A terminal window titled 'VIO0 - PuTTYtel' is overlaid on the right side of the EC-Engineer window, showing a series of 'root@vmf:/mnt/rtfiles#' prompts. Below the terminal window, there is a diagram illustrating two configuration methods: 'Online Configuration' (Slaves connected to engineering system) and 'Remote Configuration' (Slaves connected to target system). The diagram shows a laptop connected to a 'Master' unit via 'TCP/IP', which then connects to multiple 'Slave' units via 'EtherCAT'.

Run the EC-Master demo application - 1

- Copy all files from C:\EC-Master-Linux\Bin\Linux\x86 into the rfiles folder in your workspace
- Assure the network adapter is assigned to Linux
- Connect some EtherCAT slaves to the Ethernet port
- Start LxWin and log in into the shell
- Change into the rfiles folder: `cd /mnt/rfiles`
- If you run the master stack with the Intel Gigabit network adapter:
start the demo: `./EcMasterDemo -i8254x 1 1-sp 6000`
- If you run the master stack with the Realtek Gigabit network adapter:
start the demo: `./EcMasterDemo -rtl8169 1 1-sp 6000`

Run the EC-Master demo application - 2

- If the master stack is up and running you can connect EC-Engineer running on Windows. For that purpose you need to select “Remote Configuration” in the main page, select Class A master and use the virtual network IP address: 192.168.157.2.

Slaves connected to remote system

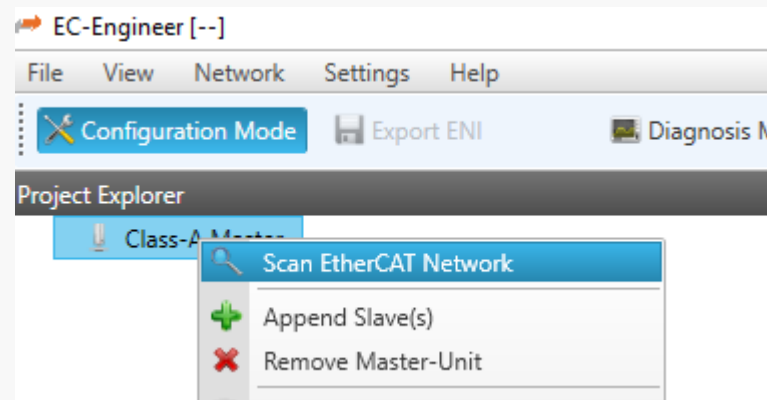
IP Address	192 . 168 . 157 . 2
Port	6000
Master-Instance	0

Deselect

- Finally you should be able to connect to the master stack running within LxWin.

EC-Master demo: Create/use an ENI file - 1

- Right click the Class-A Master in the left pane of EC-Engineer and select “Scan EtherCAT Network”



- After successfully scanning the network, please select “Export ENI”
- Store the ENI file into the rfiles folder of your workspace, use the name eni.xml

EC-Master demo: Create/use an ENI file - 2

- Restart LxWin and log in again or stop the EtherCAT demo application using CTRL-C command
- Change into the rtfiles folder: `cd /mnt/rtfiles`
- If you run the master stack with the Intel Gigabit network adapter:
start the demo:
`./EcMasterDemo -f /mnt/rtfiles/eni.xml -i8254x 1 1-sp 6000`
- If you run the master stack with the Realtek Gigabit network adapter:
start the demo:
`./EcMasterDemo -f /mnt/rtfiles/eni.xml -rtl8169 1 1-sp 6000`
- Reconnect EC-Engineer again and change into "Diagnosis Mode"

- Create a new workspace
- Use the settings described in chapter 3.4.2 of the LxWin Manual
- To execute the demo from within Visual Studio, the following steps have to be executed
 - Copy the ENI file (eni.xml) into the appropriate location (e.g. into the rtfiles folder in your workspace). In that case, the command line parameter for finding the ENI file is “-f /mnt/rtfiles/eni.xml”
 - Set the appropriate command line arguments in the “Debug settings” dialog of VisualGDB. Note: if you run the master stack with Intel Gigabit network adapter, the arguments for the demo application are “-i8254x 1 1”. For Realtek Gigabit network adapter they are “-rtl8169 1 1”
 - Example: “-f /mnt/rtfiles/eni.xml -i8254x 1 1 -perf -sp 6000”
- If the master stack is up and running you can connect EC-Engineer running on Windows. For that purpose you need to select the remote connection using the virtual network (IP address defaults to 192.168.157.2).